

What is claimed is:

- 1                   1.     A method, comprising:  
2                   receiving a first schema database comprising information having at least one  
3 of a spatial component and a remaining component;  
4                   performing data analysis thereon to determine a geospatial pattern based upon  
5 the spatial component;  
6                   storing the geospatial pattern as meta data;  
7                   aggregating data of the database into one or more groupings in accordance  
8 with the meta data; and  
9                   displaying one or more indicators associated with the one or more groupings  
10 on an n-dimensional presentation.
- 1                   2.     The method of claim 1, further comprising:  
2                   analyzing at least a portion of at least one dataset included by the database to  
3 determine at least one relationship among the groupings; and  
4                   displaying one or more indicators to denote the relationship(s) among the one  
5 or more groupings.
- 1                   3.     The method of claim 1, further comprising:  
2                   forming a virtual schema meta model based upon at least a portion of at least  
3 one dataset included by the database; and  
4                   wherein the aggregating data of the database comprises aggregating data of  
5 the database into one or more groupings in accordance with the virtual schema.
- 1                   4.     The method of claim 1, further comprising:  
2                   receiving an input indicating a criterion;  
3                   storing the input as meta data; and  
4                   aggregating data of the database into new groupings in accordance with the  
5 meta data.
- 1                   5.     The method of claim 4, wherein the input comprises at least one of:  
2                   an input from a user,

3 a defined area,  
4 a derivation based upon one or more objects on the n-dimensional  
5 presentation,  
6 a machine defined meta data; and  
7 a result of a computation.

1 6. The method of claim 5, wherein:  
2 the defined area comprises at least one of:  
3 a zip code,  
4 an area code,  
5 a census tract,  
6 a Metropolitan Statistical Area (MSA),  
7 a nation state,  
8 a state,  
9 a county,  
10 a municipality,  
11 a plat;  
12 a voting district;  
13 a precinct;  
14 a latitude, and  
15 a longitude.

1 7. The method of claim 5, wherein:  
2 the derivation based upon one or more objects on the n-dimensional  
3 presentation comprises at least one of:  
4 a sales territory,  
5 a 5-mile radius from a school,  
6 a 10 feet right of way along a street; and  
7 a region within a specified distance of a power line.

1 8. The method of claim 5, wherein:  
2 the result of a computation comprises:

3           computing an animal home range, the home range providing a region defined  
4 by activities of a target;  
5           defining within the region a first ellipse; and  
6           defining within the region a second ellipse approximately orthogonal to the  
7 first ellipse; wherein  
8           an area defined by intersection of the first ellipse and the second ellipse  
9 provides a greatest probability of finding the target.

1           9.     The method of claim 8, wherein:  
2           the target comprises at least one of:  
3           a suspect, who perpetrated criminal acts defined by the data,  
4           a customer, who completed transactions in shops defined by the data,  
5           a source of biological material, which caused infections in persons defined by  
6 the data,  
7           a source of pollution.

1           10.    The method of claim 1, wherein meta data is stored according to a  
2 hierarchy.

1           11.    The method of claim 1, further comprising:  
2           creating a data cube report for at least a portion of a dataset in the data  
3 warehouse;  
4           reducing the data cube report by aggregation to at least one tuple, comprising  
5 a GIS-object and a data point;  
6           storing the GIS-object as metadata; and  
7           aggregating like tuples for display on the n-dimensional presentation.

1           12.    The method of claim 1, wherein data analysis further comprises at  
2 least one of  
3           data mining;  
4           spatial relationship data analysis;  
5           clustering;  
6           statistical analysis; and

7 regression analysis.

1 13. The method of claim 1, wherein:

2 aggregating the groupings based upon the spatial-object meta data comprises:  
3 checking whether data points fall within a common region, and  
4 if so, aggregating data represented by the data points.

1 14. The method of claim 2, further comprising:

2 receiving a second input indicating one or more redefined regions;  
3 storing the second input as a redefined spatial-object meta data; and  
4 aggregating into new groupings based upon the spatial-object meta data.

1 15. The method of claim 3, further comprising:

2 redefining the virtual schema based upon the spatial-object meta data,  
3 comprising:  
4 receiving a second input indicating a criteria;  
5 aggregating data of the database into one or more new groupings in  
6 accordance with the redefined virtual schema and the second input indicating the criteria; and  
7 displaying one or more indicators associated with the one or more new  
8 groupings on an n-dimensional presentation.

1 16. The method of claim 3, further comprising:

2 receiving a second input indicating a relationship between a first data point  
3 and a second data point on the n-dimensional presentation;  
4 reflecting the relationship in the virtual schema;  
5 aggregating data of the database into one or more new groupings in  
6 accordance with the virtual schema; and  
7 displaying one or more indicators associated with the one or more new  
8 groupings on an n-dimensional presentation.

1 17. The method of claim 1, further comprising:

2 receiving a second database;

3           forming a virtual schema including at least a portion of a dataset included  
 4   within at least one of the first database and the second database;  
 5           receiving a first input indicating a criteria;  
 6           aggregating data of at least one of the first database and the second database  
 7   into one or more groupings in accordance with the virtual schema and the first input  
 8   indicating the criteria; and  
 9           displaying one or more indicators associated with the one or more groupings  
 10   on an n-dimensional presentation.

1           18.    A method, comprising:  
 2           receiving a first schema database comprising information having at least one  
 3   of a spatial component and a remaining component;  
 4           performing data analysis thereon to determine a geospatial pattern based upon  
 5   the spatial component;  
 6           storing the geospatial pattern as meta data;  
 7           forming a virtual schema including at least a portion of a dataset included  
 8   within the first database;  
 9           aggregating data of the database into one or more groupings in accordance  
 10   with the virtual schema and the meta data; and  
 11           displaying one or more indicators associated with the one or more groupings  
 12   on an n-dimensional presentation.

1           19.    A system, comprising:  
 2           a schema builder that generates one or more virtual schemas including at least  
 3   a portion of data input from a source, and generates mapping rules controlling data  
 4   movement into a data warehouse;  
 5           a metadata repository operative to hold the virtual schemas and mapping  
 6   rules;  
 7           a region checker;  
 8           a data analyzer; and  
 9           an n-dimensional presentation;

10                    wherein the data analyzer is operative to create at least one mapping rule  
11   based upon analysis of information in the data warehouse.

1                    20.    The system of claim 19 wherein:

2                    the source comprises at least one of a plurality of on line transaction  
3   processing (OLTP) databases.

1                    21.    An apparatus, comprising:

2                    means for generating one or more virtual schemas including at least a portion  
3   of data input from a source;

4                    means for performing data analysis on the data to determine a geospatial  
5   pattern based upon the spatial component;

6                    means for storing the geospatial pattern as meta data;

7                    means for generating one or more analysis functions based upon the virtual  
8   schemas and data input; and

9                    means for displaying an aggregated grouping of data in an n-dimensional  
10   presentation based upon the virtual schema and the meta data.

1                    22.    A computer program product, comprising:

2                    code for receiving a first schema database comprising information having at  
3   least one of a spatial component and a remaining component;

4                    code for performing data analysis thereon to determine a geospatial pattern  
5   based upon the spatial component;

6                    code for storing the geospatial pattern as meta data;

7                    code for aggregating data of the database into one or more groupings in  
8   accordance with the meta data;

9                    code for displaying one or more indicators associated with the one or more  
10   groupings on an n-dimensional presentation; and

11                    a computer readable storage medium for holding the codes.

1                    23.    A customer data analysis report produced according to the method of  
2   claim 1.